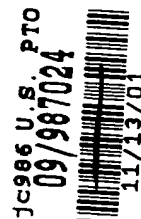




INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

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Dated 15 AUG 2001

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15NOV00 E583669-1 D02906
P01/7700 0.00-0027767.3

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

fo

1. Your reference GAF/37005.GBA

2. Patent application number
(The Patent Office will fill in this part)

0027767.3

3. Full name, address and postcode of the or of each applicant (underline all surnames)

NASTECH EUROPE LIMITED,
Torrington Avenue,
Coventry. CV4 9AE

Patents ADP number (if you know it)

6781454001

If the applicant is a corporate body, give the country/state of its incorporation

Coventry, United Kingdom

4. Title of the invention

STEERING COLUMN ASSEMBLY FOR A VEHICLE

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

RAWORTH MOSS & COOK,
36 Sydenham Road,
Croydon, Surrey. CR0 2EF
United Kingdom

Patents ADP number (if you know it)

0001362001 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country	Priority application number (if you know it)	Date of filing (day / month / year)
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing (day / month / year)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

4 /

Claim(s)

Abstract

Drawing(s)

3 + 3 RN

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

~~1 + 3 copies~~

Request for preliminary examination and search (*Patents Form 9/77*)

X

Request for substantive examination (*Patents Form 10/77*)

Any other documents
(please specify)

11. I/We request the grant of a patent on the basis of this application.

Raworth Moss & Cook.

Signature

Date

RAWORTH MOSS & COOK

14th November 2000

12. Name and daytime telephone number of person to contact in the United Kingdom

FEAKINS - 020-8688-8318

Warning

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Notes

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- b) Write your answers in capital letters using black ink or you may type them.
- c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.
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A STEERING COLUMN ASSEMBLY FOR A VEHICLE

5 This invention relates to a steering column assembly for vehicle and in particular relates to a bearing arrangement for a rake and reach adjustable steering column.

10 According to the present invention, there is provided a steering column assembly for a vehicle, including an upper column assembly, a lower column assembly and a central collapsible steering column passing through the upper and lower column assemblies; there being a central bearing comprising a cylindrical
15 tube that surrounds said central collapsible steering column, that is slidably mounted in said upper column assembly and that rotatably supports said central collapsible steering column at its lower end.

20 The central bearing may be made of a plastics material.

The central bearing may be a moulded thermoplastics tube.

25 The plastics tube may be a moulded glass or carbon fibre-filled thermoplastics tube.

30 The steering column assembly can be rake and/or reach adjustable.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

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Fig. 1 is a diagrammatic plan view of part of a steering column assembly for a vehicle;

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Fig. 2 is a side view of the assembly shown in Fig. 1;

Fig. 3 is a longitudinal sectional view of part of the assembly shown in Figs. 1 and 2;

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Fig. 4 is an exploded perspective view of part of the assembly shown in Figs. 1 to 3; and

Fig. 5 is a perspective assembled view of that part of the assembly shown in Fig. 4.

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Referring to the drawings, the steering column assembly includes an intermediate steering column drive shaft 1 for connection at its lower end to a universal joint 2 with a lower steering column drive shaft (not shown), the intermediate drive shaft 1 being coupled through a universal joint 3 at its upper end to a central drive shaft 4 that passes through a steering column mounting bracket 5. The upper end of the central column drive shaft 4, remote from the universal joint 3, has means for mounting a steering wheel (not shown) on it.

30

The central drive shaft 4 is rake and/or reach adjustable by means of an adjustment assembly 6 including a clamping mechanism.

The steering column mounting bracket is mounted at locations 7 to a vehicle cross car beam (not shown). Figs. 1 and 2 also show a top lock assembly 8 to which the adjusting assembly 6 is mounted. The top lock assembly 8 includes a cylindrical lock housing bore 9.

The central steering column 4 is also arranged to be collapsible in the event of vehicle crash and is mounted in two rotary bearings 10A and 10B (Fig. 3) each connecting the central steering column 4 to the upper and lower mounting members 7 of the mounting bracket 5.

An axially concentric tube-in-tube slidable centre bearing system is provided which allows static/dynamic axial displacement of the lower mounting bracket mounting relative to the upper mounting bracket mounting for driver-initiated reach adjustment of the steering shaft and wheel assembly and dynamic ride-down displacement top towards bottom in the event of a vehicle (head-on) crash.

The present steering column assembly includes a slidable centre bearing construction in the upper steering column assembly which comprises a cylindrical tube 11 of plastics material such as a thermo-moulded plastics acetal material which is flexibly attached to a lateral mounting bracket 12 at a lower end of the mounting bracket 5 and is axially located in, and slidably through, a bore 13 of the lock housing assembly 9 at the upper end of the mounting bracket 5. The tube 11 may alternatively be made from a glass or carbon-filled plastics acetal medium in order to obtain an enhanced bending stiffness from increase in the modular elasticity leading to a higher natural frequency of vibration for the steering column. Since the tube 11 is

of plastics material, it can be precision moulded so as to allow the component readily to make an operational slide fit within the bore 13 (which is machined) of the housing of the lock assembly 9.

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Furthermore, the material of the plastics tube 11 allows for a natural lubrication effect leading to a relatively low co-efficient of surface friction which assists in the provision of a low static breakaway and column ride-down force in the event of vehicle crash. It also accordingly has a low density when compared with conventional metallic materials, which provides weight reduction benefit.

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A bush liner 14 is provided to fit about the lower end of the plastics tube 11, the liner upon assembly fitting within the lateral mounting bracket 12 of the mounting bracket 5.

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